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PATENT APPLICATION

JUN 18 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: CA1163

Peter R. BEETHAM, et al.

Appln. No.:09/685,403

Group Art Unit: 1638

Confirmation No.: 4644

Examiner: KRUSE, David H.

Filed: October 10, 2000

For: NON-TRANSGENIC HERBICIDE RESISTANT PLANTS

SUBMISSION OF FORMAL DRAWINGS

Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith please find 14 sheet(s) of formal drawings. The Examiner is respectfully requested to acknowledge receipt of these formal drawings.

The submitted drawings incorporate the proposed drawing changes approved in the Office Action mailed 13 February 2002 (one-month extension) and are believed to obviate the informalities indicated on Form PTO-948 attached to that Office Action.

Respectfully submitted,

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Certificate of Mailing

Commissioner for Patents
Washington, D.C. 20231

Date June 13, 2002

Signed

Elaine E. Cohnquin

DNA sequence:

ccccttcatgtcttttgtagaaaccccattatctttcttagggcccaattgaaaacccacattttctttcacctaaccca
ccaaagccttgcacatgttgacgtgaacaccaaactaacacgtgtcatactgccagtggttatgataaatgctcatacc
ataccagagtcatagagttttggttggtgaaagatttgacggatgccttcttctcatttctcaccaactccctccaaa
cccaacaaaatgtttatattagcaaagccgccaaagtgtaaacgaaagtttataaatttcatttctgtgatcttacgta
attggaggaagatcaaaattttcaatccccattcttcgattgcttcaattgaagtttctccg

[transit peptide start]

ATGGCGCAAGTTAGCAGAATCTGCAATGGTGTGCAGAACCCATCTCTTATCTCCAATCTCTCGAAATCCAGTCAACGCA
AATCTCCCTTATCGGTTTCTCTGAAGACGCAGCAGCATCCACGAGCTTATCCGATTTCGTCGTCGTGGGGATTGAAGAA
GAGTGGGATGACGTTAATTGGCTCTGAGCTTCGTCCTCTTAAGGTCATGTCTTCTGTTTCCACGGCGGAG

[mature peptide starts]

AAAGCGTCGGAGATTGTACTTCAACCCATTAGAGAAATCTCCGGTCTTATTAAGCTTCCTGGCTCCAAGTCTCTATCAA
ATCGGATCCTGCTTCTCGCTGCTCTGTCTGAGGTATATATCACTTCGTTTCGTCCTTCTCTGTAATCTGAACTTAGATT
ATAAAGATTGATACTTTACCATTTTGCTGTGGTTTTATAGGGAACAACTGTAGTGGACAACTTGTTGAATAGCGATGAC
ATCAATTACATGCTTGATGCGTTGAAGAGATTGGGACTTAATCTCGAAACTGACAGTGAAAATAATCGTGCTGTAGTTG
AAGGATGTGGCGGGATATTCCCAGCTTCCATAGATTCAAAGAGTGATATCGAACTTTACCTCGGTAATGCA**GGAACA**GC
AATGCGT**CCA**CTTACCGCTGCGGTCACTGCTGCAGGTGGAAACGCAAGGTAGATTGAAGGAGTTGATGCTTCTTGGTAT
TTGATGTTTAAGGAATGGAGCTTTTGTTGATGCTTTATGATCCATTTATTCCAGTTATGTGCTTGATGGGGTGCCTCGT
ATGAGAGAAAGACCTATAGGGGATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGAATGTACTCTTGGAACTA
ACTGCCCTCCTGTTCGTGTCAACGCTAATGGTGGCCTTCCCGGTGGAAAGGTTAGATCTTGCAAATGGCATGTGAATAT
GTAATCTCGTTCCTTACTCTATGAACACTTGCAGAAATGTGTGTTCATCATAGCCTTAGCTTGACAAGATTTCAGTTTT
TAATCTACTCTCAACGGATGGATCCTAAAATAGAATCGGATTTGGTGATTGGTTTTCGTTCTCGATTACCGTTTTCGTT
GTATGATTTCTTGATTAACAATTAGGAGACATGTTATGCATTTGCAGGTGAAGCTTTCTGGATCAATTAGTAGTCAGTA
CTTGACTGCTCTGCTCATGTCTGCTCCCTTAGCTCTTGGAGACGTCGAGATTGAGATTGTCGATAAATTAATTTCTGTT
CCATATGTTGAAATGACATTGAAGTTGATGGAACGTTTCGGGGTTAGTGTCGAGCATAGTGATAGCTGGGATCGTTTCT
TTGTCAAGGGCGGGCAAAAATACAAGTAGGAGTTATTCTTTTCTTCCTTTTCTGAAATCACATCCCTTAGCTTGACAAT
ATAATGACTAAAAGGTGAATGATTCAGGTCTCCGGGTAATGCGTATGTAGAAGGTGATGCTTCTAGTGCATGTTATTTC
TTGGCTGGTGCTGCCATTACCGGTGAAACTGTCACAGTCGAAGGTTGTGGAACTACCAGCTTGCAGGTAATATTTGTAC
ACTGAATCATCGACGAGGCTGTTAAGTTTATAGTGAAATTCGTCTAGGTCAAAGTTTCATCTTTTGACAAGTTGTATAT
AACATATTCGCAAGATTCTAAGCTCAATTTTTGTGATGAATCTCTAGGGAGATGTAAAATTCGCCGAGGTCCTTGAGAA
AATGGGATGTAAAGTGTCCTGGACAGAGAACAGTGTGACTGTGACAGGACCACCTAGAGATGCTTTTGGAATGAGACAC
TTGCGGGCTATTGATGTCAACATGAACAAAATGCCTGATGTAGCCATGACCCTTGCCGTCGTTGCTCTCTTTGCTGACG
GTCCAACCACCATTAGAGATGGTAAGTAAAAAGCTCTCTCTTATAATTAAGGTTTCTCAATATTCATGATCACTTAATT
CTGTTTGGTTAATATAGTGGCTAGCTGGAGAGTAAAGGAGACAGAAAGGATGATTGCCATTTGCACAGAGCTTAGAAAA
GTAAGAGATTCTTATCTCTCTCTTTCTGTCTCTTGACAGTGCTCATTCTAAGTAATTAGCTCATAAATTTGTGTGTTTG
TGTTCAGCTGGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCGCCCAAAAAGGTGAAAACGGCAGAG
ATTGATACATATGATGATCATAGAATGGCAATGGCATTCTCTCTTGCAGCTTGTGCTGATGTTCCAATCACCATCAACG
ACTCTGGTTGCACCAGGAAAACCTTCCCCGACTACTTCCAAGTACTTGAAAGAATCACAAAGCAC**TAA**acaataaactc
tgtttttttcttctgatccaagctt

FIG. 1A

Protein sequence:

MAQVSRICNGVQNPSLISNLSKSSQRKSPLSVSLKTQQHPRAYPISSSWGLKKSGMTLIGSELRPLKVMSSVSTAE
KASEIVLQPIREISGLIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLDALKRLGLNVETDSENNRAVV
EGCGGIFPASIDSKSDIELYLGNA**GT**AMR**P**LTAAVTAAGGNASYVLDGVPRMRERPIGDLVVGLKQLGADVECTLG
TNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMSAPLALGDVEIEIVDKLISVPYVEMTLKLMERFGVSVEHSD
SWDRFFVKGGQKYKSPGNAYVEGDASSACYFLAGAAITGETVTVEGCGTTSLQGDVKFAEVLEKMGCKVSWTENSV
TVTGPPRDAFGMRHLRAIDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETERMIAICTELRKLGATVEEG
SDYCVITPPKKVKTAEIDTYDDHRMAMAFSLAACADVPITINDSGCTRKTFPDYFQVLERITKH

FIG. 1B

Arabidopsis thaliana wild type sequence:

Position	173	174	175	176	177	178	179	180	181	182	183
	L	*G*	*N*	*A*	*G*	*T*	*A*	*M*	*R*	*P*	*L*
	CTC	GGT	AAT	GCA	GGA	ACA	GCA	ATG	CGT	CCA	CTT

Arabidopsis thaliana mutant sequences:

Name											
A_{177}	CTC	GGT	AAT	GCA	GCA	ACA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*T*	*A*	*M*	*R*	*P*	*L*
I_{178}	CTC	GGT	AAT	GCA	GGA	ATA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*I*	*T*	*A*	*M*	*R*	*P*	*L*
$A_{177}I_{178}$	CTC	GGT	AAT	GCA	GCA	ATA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*I*	*A*	*M*	*R*	*P*	*L*
$I_{178}S_{182}$	CTC	GGT	AAT	GCA	GGA	ATA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*G*	*I*	*A*	*M*	*R*	*S*	*L*
$A_{177}S_{182}$	CTC	GGT	AAT	GCA	GCA	ACA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*A*	*T*	*A*	*M*	*R*	*S*	*L*
$A_{177}I_{178}S_{182}$	CTC	GGT	AAT	GCA	GCA	ATA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*A*	*I*	*A*	*M*	*R*	*S*	*L*
$V_{178}S_{182}$	CTC	GGT	AAT	GCA	GGA	GTA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*G*	*V*	*A*	*M*	*R*	*S*	*L*
$L_{178}S_{182}$	CTC	GGT	AAT	GCA	GGA	TTA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*G*	*L*	*A*	*M*	*R*	*S*	*L*
$A_{177}V_{178}$	CTC	GGT	AAT	GCA	GCA	GTA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*V*	*A*	*M*	*R*	*P*	*L*
$A_{177}L_{178}$	CTC	GGT	AAT	GCA	GCA	TTA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*L*	*A*	*M*	*R*	*P*	*L*

FIG. 2

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                                                                                   Section 1
            (1) 1        10        20        30        40        50        60         71
 DNA.seq    (1) ATGGCGCAAGTTAGCAGAATCTGCAATGGTGTGCAGAACCCAT---CTCTTATCTCCAATCTCTCGAAATC
 cdna.seq   (1) ATGGCGCAATCTAGCAGAATCTGCCATGGCGTGCAGAACCCATGTGTTATCATCTCCAATCTCTCCAAATC
 cdna.seq   (1) ATGGCACAAATTAACAACATGGCTCAAGGGATACAAACCCTTA---ATCCCAATTCCAATTTCCATAAACC
 psps.seq   (1) GCGG-------------------------------------------------------------------
 onsensus   (1) ATGGCGCAA TTAGCAGAATCTGCCATGG GTGCAGAACCCAT    TCTCATCTCCAATCTCTC AAATC
                                                                                   Section 2
           (72) 72      80        90        100       110       120       130       142
 DNA.seq   (69) CAGTCAACGCAAATCTCC---CTTATCGGTTTCT---CTGAAGACGCAGCAGCATCCACGAGCTTATCCGA
 cdna.seq  (72) CAACCAAAACAAATCACC---TTTCTCCGTCTCC---TTGAAGACGCATCAGC---CTCGAGCTT------
 cdna.seq  (69) CCAAGTTCCTAAATCTTCAAGTTTTCTTGTTTTTGGATCTAAAAAACTGAAAAATTCAGCAAATT------
 psps.seq   (5) -----------------------------------------------------------------------
 onsensus  (72) CAA CAAC CAAATCTCC   TTT TC GTTTCT   TTGAAGACGCAGCAGCAT CACGAGCTT
                                                                                   Section 3
          (143) 143    150       160       170       180       190       200        213
 DNA.seq  (134) TTTCGTCGTCGTGGGGATTGAAGAAGAGTGGGATGACGTTAATTGGCTCTGAGCTTCGTCCTCTTAAGGTC
 cdna.seq (128) ------CTTCGTGGGGATTGAAGAAGAGTGGAACGATGCTAAACGGTTCTGTAATTCGCCCGGTTAAGGTA
 cdna.seq (134) ------CTATGTTGGTTTTGAAAAAAGATTCAATTTT------TATGCAAAAGTTTTGTTCCTTTAGGATT
 psps.seq   (5) ---------------------------------------GTGCCGAG-----------------------
 onsensus (143)       CTTCGTGGGGATTGAAGAAGAGTGGAATGATG TAA TGGCTCTGAG TTCGTCC  TTAAGGT
                                                                                   Section 4
          (214) 214   220       230       240       250       260       270         284
 DNA.seq  (205) ATGTCTTCTGTTTCCACGGCGGAGAAAGCGTCGGAGATTGTACTTCAACCCATTAGAGAAATCTCCGGTCT
 cdna.seq (193) ACAGCTTCTGTTTCCACGTCCGAGAAAGCTTCAGAGATTGTGCTTCAACCAATCAGAGAAATCTCGGGTCT
 cdna.seq (193) TCAGCATCAGTGGCTACAGCACAGAAGCCTTCTGAGATAGTGTTGCAACCCATTAAAGAGATTTCAGGCAC
 psps.seq  (13) -------------------------GAGATCGTGCTGCAGCCCATCAAGGAGATCTCCGGCACCGTCAA
 onsensus (214) ACAGCTTCTGTTTCCACGGC GAGAAAGCTTC GAGATTGTGCTTCAACCCATTAGAGAAATCTCCGGTCT
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                                                                                     Section 5
             (285) 285  290       300       310       320       330       340            355
 :DNA.seq    (276) TATTAAGCTTCCTGGCTCCAAGTCTCTATCAAATCGGATCCTGCTTCTCGCTGCTCTGTCTGAGGGAACAA
 scdna.seq   (264) CATTAAGCTACCCGGATCCAAATCTCTCTCCAATCGGATCCTCCTTCTTGCCGCTCTATCTGAGGGAACTA
 acdna.seq   (264) TGTTAAATTGCCTGGCTCTAAATCATTATCTAATAGAATTCTCCTTCTTGCTGCCTTATCTGAAGGAACAA
 epsps.seq    (57) GCTGCCGGGGTCCAAGTCGCTTTCCAACCGGATCCTCCTACTCGCCGCCCTGTCCGAGGGGACAACAGTGG
 onsensus    (285) TATTAAGCTGCCTGGCTCCAAATCTCTCTC AATCGGATCCTCCTTCTTGCTGCTCTGTCTGAGGGAACAA
                                                                                     Section 6
             (356) 356           370       380       390       400       410             426
 :DNA.seq    (347) CTGTAGTGGACAACTTGTTGAATAGCGATGACATCAATTACATGCTTGATGCGTTGAAGAGATTGGGACTT
 scdna.seq   (335) CTGTAGTGGACAACTTGTTGAACAGTGATGACATCAACTACATGCTTGATGCGTTGAAGAAGCTGGGGCTT
 acdna.seq   (335) CTGTGGTTGACAATTTACTAAGTAGTGATGATATTCATTACATGCTTGGTGCCTTGAAAACACTTGGACTG
 epsps.seq   (128) TTGATAACCTGCTGAACAGTGAGGATGTCCACTACATGCTCGGGGCCTTGAGGACTCTTGGTCTCTCTGTC
 onsensus    (356) CTGTAGTGGACAACTTGTTGAATAGTGATGACATCAATTACATGCTTGATGCGTTGAAGAGACTGGGACTT
                                                                                     Section 7
             (427) 427           440       450       460       470       480             497
 :DNA.seq    (418) AATGTGGAAACTGACAGTGAAAATAATCGTGCTGTAGTTGAAGGATGTGGCGGATATTCCCAGCTTCCAT
 scdna.seq   (406) AACGTGGAACGTGACAGTGTAAACAACCGTGCGGTTGTTGAAGGATGCGGTGGAATATTCCCAGCTTCCTT
 acdna.seq   (406) CATGTAGAAGAAGATAGTGCAAACCAACGAGCTGTTGTTGAAGGTTGTGGTGGCTTTTCCCTGTTGGTAA
 epsps.seq   (199) GAAGCGGACAAAGCTGCCAAAAGAGCTGTAGTTGTTGGCTGTGGTGGAAAGTTCCCAGTTG---AGGATGC
 onsensus    (427) AATGTGGAAAATGATAGTGAAAACAATCGTGCTGTTGTTGAAGGTTGTGGTGGCTATTCCCAGCTTCTAT
                                                                                     Section 8
             (498) 498           510       520       530       540       550             568
 :DNA.seq    (489) AGATTCAAAGAGTGATATCGAACTTTACCTCGGTAATGCAGGAACAGCAATGCGTCCACTTACCGCTGCGG
 scdna.seq   (477) AGATTCCAAGAGTGATATTGAGTTGTACCTTGGGAATGCAGGAACAGCCATGCGTCCACTCACCGCTGCAG
 acdna.seq   (477) AGAGTCCAAGGAAGAAATTCAACTGTTCCTTGGAAATGCAGGAACAGCAATGCGGCCACTAACAGCAGCAG
 epsps.seq   (267) TAAAGAGGAAGTGCAGCTCTTCTTGGGGAATGCTGGAACTGCAATGCGGCCATTGACAGCAGCTGTTACTG
 onsensus    (498) AGATTCCAAGGGTGATATTGAATTGTACCTTGGTAATGCAGGAACAGCAATGCGTCCACTAACCGCTGCAG
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                                                                                Section 9
             (569) 569        580         590         600         610         620              639
   DNA.seq   (560) TCACTGCTGCAGGTGGAAACGCAAGTTATGTGCTTGATGGGGTGCCTCGTATGAGAGAAAGACCTATAGGG
  cdna.seq   (548) TTACAGCTGCAGGTGGCAACGCGAGTTATGTACTTGATGGGGTGCCTAGAATGAGGGAAAGACCTATAGGA
  cdna.seq   (548) TTACTGTAGCTGGTGGAAATTCAAGGTATGTACTTGATGGAGTTCCTCGAATGAGAGAGAGACCAATTAGT
  psps.seq   (338) CTGCTGGTGGAAATGCAACTTACGTGCTTGATGGAGTACCAAGAATGAGGGAGAGACCCATTGGCGACTTG
  nsensus    (569) TTACTGCTGCAGGTGGAAATTCAAGTTATGTACTTGATGGGGTGCCTCGAATGAGAGAAAGACCTATAGGG
                                                                               Section 10
             (640) 640        650         660         670         680         690         700     710
   DNA.seq   (631) GATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGAATGTACTCTTGGAACTAACTGCCCTCCTGT
  cdna.seq   (619) GATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGAGTGTACTCTTGGCACTAACTGTCCTCCTGT
  cdna.seq   (619) GATTTGGTTGATGGTCTTAAACAGCTTGGTGCAGAGGTTGATTGTTTCCTTGGTACGAAATGTCCTCCTGT
  psps.seq   (409) GTTGTCGGATTGAAGCAGCTTGGTGCAGATGTTGATTGTTTCCTTGGCACTGACTGCCCACCTGTTCGTGT
  nsensus    (640) GATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGA TGTACTCTTGGCACTAACTGTCCTCCTGT
                                                                               Section 11
             (711) 711      720         730         740         750         760         770      781
   DNA.seq   (702) TCGTGTCAACGCTAATGGTGGCCTTCCCGGTGGAAAGGTGAAGCTTTCTGGATCAATTAGTAGTCAGTACT
  cdna.seq   (690) TCGTGTCAATGCTAATGGTGGCCTTCCCGGTGGAAAGGTGAAGCTTTCTGGATCGATCAGTAGTCAGTACT
  cdna.seq   (690) TCGAATTGTCAGCAAGGGAGGTCTTCCTGGAGGGAAGGTCAAGCTCTCTGGATCCATTAGCAGCCAATACT
  psps.seq   (480) CAATGGAATCGGAGGGCTACCTGGTGGCAAGGTCAAGCTGTCTGGCTCCATCAGCAGTCAGTACTTGAGTG
  nsensus    (711) TCGTGTCATCGGTAATGGTGGTCTTCCCGGTGGAAAGGTGAAGCTTTCTGGATCCATTAGTAGTCAGTACT
                                                                               Section 12
             (782) 782      790         800         810         820         830         840      852
   DNA.seq   (773) TGACTGCTCTGCTCATGTCTGCTCCCTTAGCTCTTGGAGACGTCGAGATTGAGATTGTCGATAAATTAATT
  cdna.seq   (761) TGACTGCCCTCCTCATGGCAGCTCCTTTAGCTCTTGGAGACGTGGAGATTGAGATCATTGATAAACTGATA
  cdna.seq   (761) TGACTGCTCTGCTTATGGCTGCTCCACTGGCTTTAGGAGATGTGGAGATTGAAATCATTGACAAACTAATT
  psps.seq   (551) CCTTGCTGATGGCTGCTCCTTTGGCTCTTGGGGATGTGGAGATTGAAATCATTGATAAATTAATCTCCATT
  nsensus    (782) TGACTGCTCTGCTTATGGCTGCTCCTTTAGCTCTTGGAGACGTGGAGATTGAGATTATTGATAAATTAATT
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                                                                                  Section 13
           (853) 853    860       870       880       890       900       910          923
 DNA.seq   (844) TCTGTTCCATATGTTGAAATGACATTGAAGTTGATGGAACGTTTCGGGGTTAGTGTCGAGCATAGTGATAG
 cdna.seq  (832) TCTGTTCCATATGTTGAAATGACATTGAAGTTGATGGAGCGTTTTGGTGTTAGTGCCGAGCATAGTGATAG
 cdna.seq  (832) AGTGTACCTTATGTCGAGATGACATTGAAGTTGATGGAGCGATTTGGTATTTCTGTGGAGCACAGTAGTAG
 psps.seq  (622) CCGTACGTCGAAATGACATTGAGATTGATGGAGCGTTTTGGTGTGAAAGCAGAGCATTCTGATAGCTGGGA
 nsensus   (853) TCTGTTCCATATGTTGAAATGACATTGAAGTTGATGGAGCGTTTTGGTGTTAGTGTCGAGCATAGTGGTAG
                                                                                  Section 14
           (924) 924   930       940       950       960       970       980            994
 DNA.seq   (915) CTGGGATCGTTTCTTTGTCAAGGGCGGCAAAAATACAAGTCTCCGGGTAATGCGTATGTAGAAGGTGATG
 cdna.seq  (903) CTGGGATCGTTTCTTTGTCAAGGGCGGTCAGAAATACAAGTCGCCTGGTAATGCTTATGTAGAAGGTGATG
 cdna.seq  (903) CTGGGACAGGTTCTTTGTCCGAGGAGGTCAGAAATACAAGTCTCCTGGAAAAGCTTTTGTCGAAGGTGATG
 psps.seq  (693) CAGATTCTACATTAAGGGAGGTCAAAAATACAAGTCCCCTAAAAATGCCTATGTTGAAGGTGATGCCTCAA
 nsensus   (924) CTGGGATCGTTTCTTTGTCAGGGGCGGTCAGAAATACAAGTCTCCTGGTAATGCTTATGTAGAAGGTGATG
                                                                                  Section 15
           (995) 995  1000      1010      1020      1030      1040      1050          1065
 DNA.seq   (986) CTTCTAGTGCATGTTATTTCTTGGCTGGTGCTGCCATTACCGGTGAAACTGTCACAGTCGAAGGTTGTGGA
 cdna.seq  (974) CTTCTAGTGCTAGCTATTTCTTGGCTGGTGCTGCCATTACTGGTGAAACTGTTACTGTCGAAGGTTGTGGA
 cdna.seq  (974) CTTCAAGTGCTAGCTACTTCTTGGCTGGTGCAGCAGTCACAGGTGGAACTATCACTGTTGAAGGTTGTGGG
 psps.seq  (764) GCGCAAGCTATTTCTTGGCTGGTGCTGCAATTACTGGAGGGACTGTGACTGTGGAAGGTTGTGGCACCACC
 nsensus   (995) CTTCTAGTGCTTGCTATTTCTTGGCTGGTGCTGCCGTTAC GGTGAAACTGTCACTGTTGAAGGTTGTGGA
                                                                                  Section 16
          (1066) 1066        1080      1090      1100      1110      1120             1136
 DNA.seq  (1057) ACTACCAGCTTGCAGGGAGATGTAAAATTCGCCGAGGTCCTTGAGAAAATGGGATGTAAAGTGTCCTGGAC
 cdna.seq (1045) ACAACTAGCCTCCAGGGAGATGTGAAATTCGCAGAGGTTCTTGAGAAAATGGGATGTAAAGTGTCATGGAC
 cdna.seq (1045) ACAAACAGTTTACAGGGGGATGTCAAATTTGCTGAGGTACTTGAAAAAATGGGAGCTGAAGTTACGTGGAC
 psps.seq  (835) AGTTTGCAGGGTGATGTGAAGTTTGCTGAGGTACTGGAGATGATGGGAGCGAAGGTTACATGGACCGAGAC
 nsensus  (1066) ACTACCAGCTT CAGGGGGATGT AAATTCGCAGAGGT CTTGAGAAAATGGGATGTAAAGTGTCCTGGAC
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                                                                              Section 17
          (1137) 1137           1150       1160       1170       1180       1190           1207
:DNA.seq  (1128) AGAGAACAGTGTGACTGTGACAGGACCACCTAGAGATGCTTTTGGAATGAGACACTTGCGGGCTATTGATG
scdna.seq (1116) AGAGAACAGTGTGACTGTGACTGGACCATCAAGAGATGCTTTTGGAATGAGGCACTTGCGTGCTGTTGATG
acdna.seq (1116) AGAGAACAGTGTCACAGTCAAAGGACCTCCAAGGAGTTCTTCTGGGAGGAAGCATTTGCGTGCCATTGATG
epsps.seq  (906) TAGCGTAACTGTTACTGGCCCACCGCGGGAGCCATTTGGGAGGAAACACCTCAAGGCGATTGATGTCAACA
onsensus  (1137) AGAGAACAGTGTGACTGTGACAGGACCACCAAGAGATGCTTTTGGAATGAGGCACTTGCGTGCTGTTGATG
                                                                              Section 18
          (1208) 1208        1220       1230       1240       1250       1260           1278
:DNA.seq  (1199) TCAACATGAACAAAATGCCTGATGTAGCCATGACCCTTGCCGTCGTTGCTCTCTTTGCTGACGGTCCAACC
scdna.seq (1187) TCAACATGAACAAAATGCCTGATGTAGCCATGACTCTAGCCGTTGTTGCTCTCTTTGCCGATGGTCCAACC
acdna.seq (1187) TGAACATGAATAAAATGCCTGATGTTGCCATGACACTTGCTGTTGTTGCACTTTATGCTGATGGTCCCACA
epsps.seq  (977) TGAACAAGATGCCTGATGTCGCCATGACTCTTGCTGTGGTTGCCCTCTTTGCCGATGGCCCGACAGCCATC
onsensus  (1208) TGAACATGAACAAAATGCCTGATGTAGCCATGACTCTTGCTGTTGTTGCTCTCTTTGCTGATGGTCCCACC
                                                                              Section 19
          (1279) 1279        1290       1300       1310       1320       1330           1349
:DNA.seq  (1270) ACCATTAGAGATGTGGCTAGCTGGAGAGTAAAGGAGACAGAAAGGATGATTGCCATTTGCACAGAGCTTAG
scdna.seq (1258) ACCATCAGAGATGTGGCTAGCTGGAGAGTTAAGGAGACAGAGAGGATGATTGCCATTTGCACAGAGCTTAG
acdna.seq (1258) GCTATAAGAGATGTTGCTAGCTGGAGAGTCAAGGAAACTGAGCGCATGATCGCCATATGCACAGAACTTAG
epsps.seq (1048) AGAGACGTGGCTTCCTGGAGAGTAAAGGAGACCGAGAGGATGGTTGCGATCCGGACGGAGCTAACCAAGCT
onsensus  (1279) ACCATCAGAGATGTGGCTAGCTGGAGAGT AAGGAGACAGAGAGGATGATTGCCATTTGCACAGAGCTTAG
                                                                              Section 20
          (1350) 1350       1360       1370       1380       1390       1400       1410    1420
:DNA.seq  (1341) AAAACTGGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCGCCCAAAAAGGTGAAAACGG
scdna.seq (1329) AAAGCTTGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCACCAGCAAAGGTGAAACCGG
acdna.seq (1329) GAAGTTAGGAGCAACCGTTGAAGAAGGACCAGACTACTGCATAATCACCCCACCGGAGAAACTAAATGTGA
epsps.seq (1119) GGGAGCATCTGTTGAGGAAGGGCCGGACTACTGCATCATCACGCCGCCGGAGAAGCTGAACGTGACGGCGA
onsensus  (1350) GAAGCTAGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCGCCGGAGAAGGTGAAAGCGG
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                                                                                          Section 21
          (1421) 1421      1430      1440      1450      1460      1470      1480         1491
 :DNA.seq (1412) CAGAGATTGATACATATGATGATCATAGAATGGCAATGGCATTCTCTCTTGCAGCTTGTGCTGATGTTCCA
scdna.seq (1400) CGGAGATTGATACGTATGATGATCATAGAATGGCGATGGCGTTCTCGCTTGCAGCTTGTGCTGATGTTCCA
acdna.seq (1400) CCGATATTGATACATACGATGATCACAGGATGGCCATGGCTTTTTCTCTTGCTGCTTGTGCAGATGTTCCC
epsps.seq (1190) TCGACACGTACGACGACCACAGGATGGCCATGGCCTTCTCCCTTGCCGCCTGTGCCGAGGTCCCCGTCACC
onsensus (1421) CCGAGATTGATACATATGATGATCATAGAATGGCCATGGC TTTTCTCTTGCTGCTTGTGCTGATGTTCCC
                                                                                          Section 22
          (1492) 1492     1500      1510      1520      1530      1540      1550           1562
 :DNA.seq (1483) ATCACCATCAACGACTCTGGTTGCACCAGGAAAACCTTCCCCGACTACTTCCAAGTACTTGAAAGAATCAC
scdna.seq (1471) GTCACCATCAAGGATCCTGGCTGCACCAGGAAGACTTTCCCTGACTACTTCCAAGTCCTTGAAAGTATCAC
acdna.seq (1471) GTCACCATCAATGACCCTGGCTGCACGCGGAAAACCTTCCCTAACTACTTTGATGTACTTCAGCAGTACTC
epsps.seq (1261) ATCCGGGACCCTGGGTGCACCCGGAAGACCTTCCCCGACTACTTCGATGTGCTGAGCACTTTCGTCAAGAA
onsensus (1492) GTCACCATCAATGACTCTGGCTGCACGAGGAAAACCTTCCCTGACTACTTCCAAGTCCTTGAAAG ATCAC
                                                                                          Section 23
          (1563) 1563     1572
 :DNA.seq (1554) AAAGCACTAA
scdna.seq (1542) AAAGCATTAA
acdna.seq (1542) CAAGCATTGA
epsps.seq (1332) TTAA------
onsensus (1563) AAAGCATTAA
```

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                                                                                      Section 1
       (1) 1       10        20        30        40        50        60          74
 PRO   (1) MAQVSRICNGVQNP-SLISNLSKSSQRKSPLSVSLKTQQHPRAYPISSSWGLKKSGMTLIGSELR------PLK
.PRO   (1) MAQSSRICHGVQNPCVIISNLSKSNQNKSPFSVSLKTHQ-----PRASSWGLKKSGTMLNGSVIR------PVK
.PRO   (1) MAQINNMAQGIQTL-NPNSNFHKPQVPKSSSFLVFGSKK-----LKNSA-----NSMLVLKKDSIFMQKFCSFR
 PRO   (1) AG------------------------------------------------------------------------
ensus  (1) MAQISRICNGVQNP  IISNLSKSNQ KSP SVSLKT Q     PKASSWGLKKSGMLLIGSDIR      PLK
                                                                                      Section 2
      (75) 75  80        90        100       110       120       130              148
 PRO  (68) VMSSVSTAEKASEIVLQPIREISGLIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLDALKRLGLNV
.PRO  (64) VTASVSTSEKASEIVLQPIREISGLIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLDALKKLGLNV
.PRO  (64) ISASVATAQKPSEIVLQPIKEISGTVKLPGSKSLSNRILLLAALSEGTTVVDNLLSSDDIHYMLGALKTLGLHV
.PRO   (3) ----------AEEIVLQPIKEISGTVKLPGSKSLSNRILLLAALSEGTTVVDNLLNSEDVHYMLGALRTLGLSV
ensus (75) VSASVSTAEKASEIVLQPIKEISGTIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLGALKTLGLNV
                                                                                      Section 3
     (149) 149       160       170       180       190       200       210        222
 PRO (142) ETDSENNRAVVEGCGGIFPASIDSKSDIELYLGNAGTAMRPLTAAVTAAGGNASYVLDGVPRMRERPIGDLVVG
.PRO (138) ERDSVNNRAVVEGCGGIFPASLDSKSDIELYLGNAGTAMRPLTAAVTAAGGNASYVLDGVPRMRERPIGDLVVG
.PRO (138) EEDSANQRAVVEGCGGLFPVGKESKEEIQLFLGNAGTAMRPLTAAVTVAGGNSRYVLDGVPRMRERPISDLVDG
.PRO  (67) EADKAAKRAVVVGCGGKFPV-EDAKEEVQLFLGNAGTAMRPLTAAVTAAGGNATYVLDGVPRMRERPIGDLVVG
ensus(149) E DSANNRAVVEGCGGIFPVSIDSKSDIQLFLGNAGTAMRPLTAAVTAAGGNASYVLDGVPRMRERPIGDLVVG
                                                                                      Section 4
     (223) 223    230       240       250       260       270       280          296
.PRO (216) LKQLGADVECTLGTNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMSAPLALGDVEIEIVDKLISVPYVEMT
.PRO (212) LKQLGADVECTLGTNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMAAPLALGDVEIEIIDKLISVPYVEMT
.PRO (212) LKQLGAEVDCFLGTKCPPVRIVSKGGLPGGKVKLSGSISSQYLTALLMAAPLALGDVEIEIIDKLISVPYVEMT
.PRO (140) LKQLGADVDCFLGTDCPPVRVNGIGGLPGGKVKLSGSISSQYLSALLMAAPLALGDVEIEIIDKLISIPYVEMT
ensus(223) LKQLGADVDCTLGTNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMAAPLALGDVEIEIIDKLISVPYVEMT
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                                                                                          Section 5
      (297) 297          310       320       330       340       350       360       370
 .PRO (290) LKLMERFGVSVEHSDSWDRFFVKGGQKYKSPGNAYVEGDASSACYFLAGAAITGETVTVEGCGTTSLQGDVKFA
 .PRO (286) LKLMERFGVSAEHSDSWDRFFVKGGQKYKSPGNAYVEGDASSASYFLAGAAITGETVTVEGCGTTSLQGDVKFA
 .PRO (286) LKLMERFGISVEHSSSWDRFFVRGGQKYKSPGKAFVEGDASSASYFLAGAAVTGGTITVEGCGTNSLQGDVKFA
 .PRO (214) LRLMERFGVKAEHSDSWDRFYIKGGQKYKSPKNAYVEGDASSASYFLAGAAITGGTVTVEGCGTTSLQGDVKFA
ensus (297) LKLMERFGVSVEHSDSWDRFFVKGGQKYKSPGNAYVEGDASSASYFLAGAAITGGTVTVEGCGTTSLQGDVKFA
                                                                                          Section 6
      (371) 371      380       390       400       410       420       430           444
 .PRO (364) EVLEKMGCKVSWTENSVTVTGPPRDAFGMRHLRAIDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETE
 .PRO (360) EVLEKMGCKVSWTENSVTVTGPSRDAFGMRHLRAVDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETE
 .PRO (360) EVLEKMGAEVTWTENSVTVKGPPRSSSGRKHLRAIDVNMNKMPDVAMTLAVVALXADGPTAIRDVASWRVKETE
 .PRO (288) EVLEMMGAKVTWTETSVTVTGPPREPFGRKHLKAIDVNMNKMPDVAMTLAVVALFADGPTAIRDVASWRVKETE
ensus (371) EVLEKMGCKVSWTENSVTVTGPPRDAFGRKHLRAIDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETE
                                                                                          Section 7
      (445) 445  450       460       470       480       490       500                518
 .PRO (438) RMIAICTELRKLGATVEEGSDYCVITPPKKVKTAEIDTYDDHRMAMAFSLAACADVPITINDSGCTRKTFPDYF
 .PRO (434) RMIAICTELRKLGATVEEGSDYCVITPPAKVKPAEIDTYDDHRMAMAFSLAACADVPVTIKDPGCTRKTFPDYF
 .PRO (434) RMIAICTELRKLGATVEEGPDYCIITPPEKLNVTDIDTYDDHRMAMAFSLAACADVPVTINDPGCTRKTFPNYF
 .PRO (362) RMVAIRTELTKLGASVEEGPDYCIITPPEKLNVTAIDTYDDHRMAMAFSLAACAEVPVTIRDPGCTRKTFPDYF
ensus (445) RMIAICTELRKLGATVEEGSDYCIITPPEKLNVTEIDTYDDHRMAMAFSLAACADVPVTINDPGCTRKTFPDYF
                                                                                          Section 8
      (519) 519     527
  PRO (512) QVLERITKH
 .PRO (508) QVLESITKH
 .PRO (508) DVLQQYSKH
 .PRO (436) DVLSTFVKN
ensus (519) QVLESITKH
```

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Oligo Name	Oligo Sequence (5'→3')
ATEPS-A_{177}	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGCTGT**TGC**TGCATTACCGAG
ATEPS-AI	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGC**TATTGC**TGCATTACCGAG
ATEPS-IS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TAT**TCCTGCATTACCGAG
ATEPS-AS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGCTGT**TGC**TGCATTACCGAG
ATEPS-AIS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TATTGC**TGCATTACCGAG
ATEPS-I_{177}	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGCTGT**TAT**TGCATTACCGAG
ATEPS-VS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TAC**TCCTGCATTACCGAG
ATEPS-LS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TAA**TCCTGCATTACCGAG
ATEPS-AV	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGC**TACTGC**TGCATTACCGAG
ATEPS-AL	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGC**TAATGC**TGCATTACCGAG

FIG. 5

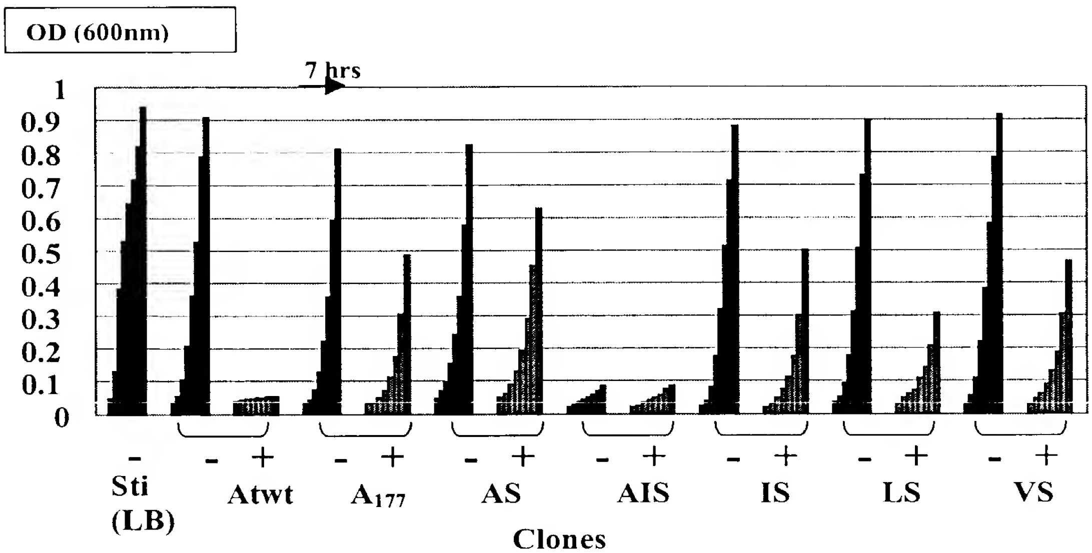
OD (600nm)
7 hrs
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-
Sti (LB)
- +
Atwt
- +
A177
- +
AS
- +
AIS
- +
IS
- +
LS
- +
VS
Clones

FIG. 6

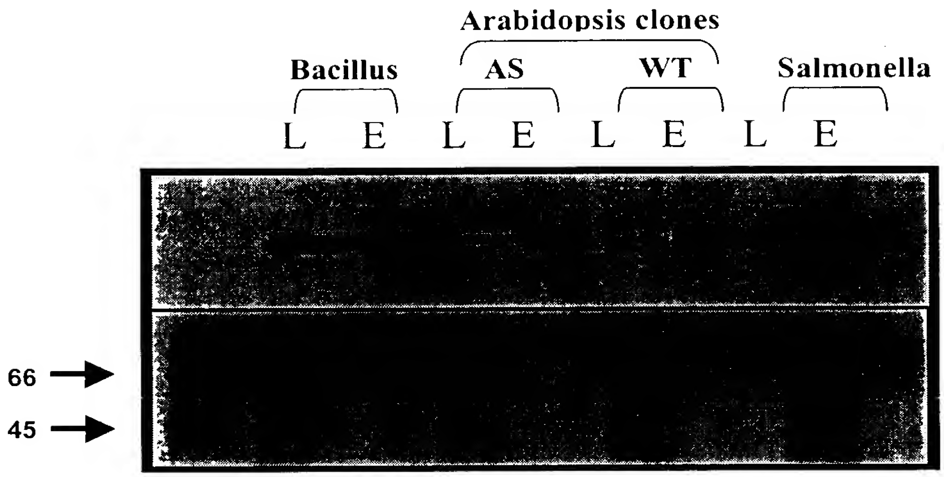
Arabidopsis clones
Bacillus
AS
WT
Salmonella
L E L E L E L E
66
45

FIG. 7